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dynamo-electric machines and only a short paragraph (p. 495) to storage cells is very unusual in this day of devotion to the practical. The transformer seems scarcely to be mentioned.

An unusual feature of the book is the use of so-called "examples" to introduce important theorems and propositions to be proved. These are presented in groups at frequent intervals and are entirely different in character from the numerical examples usually given in college texts. Numerical examples of the ordinary sort are not wanting, but about 250 of them are given together at the end of the book as "exercises." (It would seem better to call the "exercises" examples and the "examples" exercises.)

The author justifies the use of a statical measure of force, the late introduction of the relation of heat to energy and the use of the method of rays in optics, on the ground that these are in harmony with his plan of following the historical order of development.

To sound and wave-motion even less than the usual proportion of space is given, only 6 per cent. of the book being allowed it.

The treatment of heat is decidedly satisfactory, the use of the historical method being particularly well adapted to this field. This is noticeable in the discussions of thermometry and of Carnot's cycle and the second law of thermodynamics. The absence of tables in the body of the text, characteristic of the whole book, seems a marked defect in this portion. There is scarcely any reference made to the small group of tables given collectively at the end of the book.

The discussion of light is marked by a complete separation of geometrical and physical optics, each receiving practically equal attention. The discussion of velocity of light is unusually brief and that of diffraction more extended than is common in college texts.

To electricity and magnetism rather less than the usual amount of space is given (24 per cent. as compared with 32 per cent., the mean of four recent texts). Magnetism and electrostatics are treated with relative fullness, but current electricity, and particularly electro-

magnetic induction, are too briefly discussed.

The many teachers who desire to see increased emphasis placed upon the historical development of physical thought, will follow the career of this book with special interest and hope that it may have a wide introduction.

A. D. COLE

A Text-book of Physics. By H. E. HURST and R. T. LATTEY. New York, Van Nostrand. 1910. \$3.00 net.

This new text in physics comes from two Oxford University men. It is designed especially to fit students for the preliminary examination in Oxford Natural Science School. In carrying out this purpose a large number of examples are given, taken from actual examinations recently set at the universities of Cambridge, Oxford and London.

The book seems to be a combination of class text and laboratory manual. Too little attention is given to mechanics and the properties of matter are practically left out altogether. Universal gravitation and harmonic motion are other omitted topics. In the discussion of heat no treatment of the second law of thermodynamics, Carnot's cycle or the efficiency of heat engines appears. Light is presented in a very elementary way and wholly from the standpoint of geometrical optics. Interference, diffraction and polarization are not discussed at all and the treatment of spectroscopy is wholly from an elementary laboratory standpoint.

An undue amount of space—248 of the 610 pages of the book—is given to electricity and magnetism. (In contrast with this less than 100 pages are given to mechanics.) Here again some curious omissions may be noted. It seems particularly strange in an English text to find no discussion of Crookes's tubes, cathode rays, radioactivity or electrons.

The index is very incomplete and unsatisfactory. The illustrations, print, paper and general physical appearance of the book are good. The treatment of many important topics is so elementary and incomplete, and so many others are omitted altogether, that the

book would not seem to be well adapted for use as a class text in American colleges.

A. D. COLE

BOTANICAL NOTES

MORE ELEMENTARY BOTANY

FOR a long time there have been many school-men who have wished to unite the study of living things (plants and animals) into one subject, hence we have had "biology" in the curricula, and "biological" teachers, "biological" departments, as well as "biological" books. The present writer has not felt that such a fusing of two sciences is necessary, nor has he felt that it has ever been done successfully. In fact, the pupil in "biology" studies either *plants* or *animals*, unless he devotes himself to the few organisms that are on the border line between the two kingdoms, *e. g.*, the slime organisms (*Mycetozoa*), or the *Volvocineae*. This of course is never done. What is done is to take parts of the two related sciences, botany and zoology, and match them together in some fashion, and call the result "biology."

This is what has been done in the "Essentials of Biology," prepared by George W. Hunter (American Book Co., New York, 1911). In a prettily illustrated, well printed and well written book the author has attempted the impossible task of combining some study of plants and some study of animals into a consistent, single presentation. The botanical part of the book treats of flowers, fruits, seeds, roots, stems, leaves, forests, various forms of plants (only 13 pages), the modifications of plants, beneficial plants, relations of plants to animals, which is distinctly the old way of looking at plants. The zoological part begins with protozoa and takes up in succession worms, crayfishes, insects, mollusks, fishes, amphibians, reptiles, birds and mammals (and man). In the botanical part the pupil goes from higher plants to lower, while in the zoological part he goes from lower to higher.

There is much that is good in the botanical part, in fact the work seems to be good in the details, but the sequence is all wrong, and the

author has been hampered by the attempt to unite into one, two totally different conceptions of living things—plants and animals.

Accompanying this book is another designed as a companion volume, entitled "A Laboratory Manual for the Solution of Problems in Biology," by R. W. Sharp, a colleague of the author of the "Essentials of Biology." Here the same criticisms hold as to the general plan of the book. However, in each chapter the work is well done, and no doubt the book will be helpful to many a teacher of botany and zoology.

A NEW MANUAL OF BOTANY

FOR so many years we have been accustomed to looking to the well-known botanical masters for general systematic manuals that we were surprised when we picked up Dr. George T. Stevens's "Illustrated Guide to the Flowering Plants of the Middle-Atlantic and New England States" (New York, Dodd, Mead & Co., 1910). The author has not been known to the botanical fraternity as one of their number, and there was doubtless some rubbing of eyes when the book first appeared. But an examination of the book shows that the author has a good acquaintance with the systematic botany of the portion of the country which his book covers and this gives him the right to add his book to the list of manuals we already have.

Opening it, one finds a pleasantly written preface in which we observe that "the classification adopted in this work is, in the main, that of Professor Adolph Engler in his *Syllabus der Pflanzenfamilien*." Further he says: "In the preparation of the work I have made use of my very large private herbarium, a collection which has been the work of many years, but I have had constantly before me the works of the latest German, French and English authorities and I have as constantly consulted the American works of Professor Wood, Dr. Asa Gray and that of Messrs. Britton and Brown." He gives especial credit to the work of Britton & Brown.

Before the descriptive portion of the manual is entered upon there are about fifty